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PROBLEMS REGARDING THE MECHANIZATION OF AGRICULTURE

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PROBLEMS REGARDING THE MECHANIZATION OF AGRICULTURE

by
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The importance of the problem

1. The problem of the introduction of modern technique in agriculture - and within it, the problem of mechanization - is a preoccupation of ever larger circles of specialists in developing countries. This is easily understandable in view of the important place occupied by agriculture in the economic structure of these countries, while on the other hand, it is on the realization of an effective technical progress in this branch of national economy that the possibility of bringing under cultivation important areas of arable land, left outside the production process of many of these countries, is largely dependent, as are the possibilities of increasing the agricultural production necessary to the amelioration of food conditions of the population, of improving the quality of agricultural products, which plays such an important role in these countries' exports etc.

2. It is obvious that the concrete manner in which the problem is set and in which it has to be solved, differs appreciably from one country to another. In most developing countries, however, the problem of technical progress in agriculture is rendered extremely complex due to a whole series of factors (the structure of landed property, density of rural population etc.). Its solution should, according to us, take into consideration a number of general requirements, among which we mention:

a) The modification of the present structure of landed property which impedes technical progress, by the realization of land reforms by which those who actually work the land would own it. Such reforms would stimulate the peasantry to obtain larger crops, to bring new land under cultivation and to introduce agricultural machinery.

b) The consistent realization of industrialization, the purpose of the newly created industry being - among others - of supplying agriculture with up-to-date technical means, at favourable prices, and to absorb, at the same time, labour power from the countryside.

c) To find adequate inducements for attracting peasantry towards association forms (co-operation) in which the modern means of production supplied by industry could be rationally used, in common.

3. In this general context of problems and preoccupations, we propose to present, in our paper, the manner in which the problem of the mechanization of agriculture has been and is being solved in the Rumanian People's Republic.

The necessity of the mechanization of agriculture in the Rumanian People's Republic

4. The mechanization of agriculture, as a process based on the objective

economic necessity of raising the social labour productivity and the living standard of the country's rural and entire population, is achieved in Rumania, by a complex of measures, integrated into the general policy of building socialist economy and of its perfection. The objectives of this policy, as well as its realization, are established on scientific bases, by the multilateral, objective analysis of the development level of production capacities, of the structure and means at the disposal of national economy, leading them firmly, with the help of planning, towards attaining the proposed objectives.

5. In our country the mechanization of agriculture is organically linked with the creation of large state and collective farms, in a process of mutual conditioning. The results of this process, marked by the conclusion of the collectivization of agriculture in the spring of 1962, are edifying and permit the appreciation of the correctness of the road covered.

6. Before the second world war, the social-economic structure of Rumania and the development level of agriculture were characterized by several specific traits, shown in the following statistical figures: according to the 1930 census, the agricultural population represented 78.2% of the entire active population of the country, while the active industrial population was of merely 7.2%. The proportion of the national income derived from agriculture and forestry represented 38.5% of the national income obtained in the national economy (the one derived from industry representing merely 30.8%). According to the estimates of economist Colin Clark, in Rumania the national income per head of population was one of the lowest in Europe. This situation, in the conditions of the predominance of agriculture, was especially determined by the extremely low level of agriculture, of labour productivity in this field. In agriculture, the existing big landed property was based on a large scale on semifeudal relations: metayage and other forms of labour, while, on the other hand, there were millions of peasant farms, in an advanced stage of fragmentation, with very reduced economic capacities. In the whole country there were some 4000 tractors, i.e., 3700 ha. of agricultural land per tractor, 2500 ha of arable land respectively; half of the agricultural farms having up to 3 ha of land, and 30% of the farms with 3-5 ha, had no draught animal, the average being one ox reverting to five farms, and one horse to 7.8 ha. Agriculture was extensive, the agricultural implements were rudimentary. No tractor or agricultural machinery industry existed in the country. Among the numerous negative social-economic consequences, the following may be mentioned: low productivity per ha, very reduced productivity level of agricultural labour, a low consumption of agricultural and industrial products.

7. The backward state of agriculture, was aggravated by the consequences of the second world war. The damages suffered by the national economy amounted to 10,000,000 million lei, a sum equivalent to the country's budget for over 12 years (at 1945 prices).

The creation of a tractor and agricultural machinery industry, and the endowing of agriculture in the Rumanian People's Republic

8. In these conditions, the problems which were raised after the liberation of the country from the fascist yoke (August 23, 1944), were exceptionally difficult and complex. The 1945 land reform has abolished landed property and the remnants, in villages, of semi-feudal relationships, it has led to the appropriation of land to peasants with little or no land, thus contributing to the improvement of their economic condition. Among others, one of the foremost was the problem of equipping agriculture with tractors and agricultural machinery, as a condition for raising agricultural production and the living standard

of the population. But, mechanization is not always profitable in conditions of small peasant agricultural farms, therefore the problem was of transforming individual, fragmentated agriculture into an agriculture based on co-operative forms of production. The creation of such agriculture cannot be conceived without an important development of agricultural production forces, without the creation in villages of strong technical material production bases. In its turn technical material bases in agriculture cannot be created and promoted without an industry capable of producing the respective elements: tractors, agricultural machinery etc. Therefore, in the framework of the industrialization policy, special attention was lent to the development of tractor and agricultural machine building industries.

9. As a consequence, the tractor and agriculture machine building industry was set up, the output of which has grown year by year, both quantitatively and qualitatively.

a) The output of tractors and of principal agricultural machinery has increased as follows:

Table 1

	Unit	195o	1955	196o	1961
i) Tractors	pieces	3,469	3,5oo	17,1o2	2o,ooo
ii) Trailed ploughs	"	5,o3o	4,oo5	15,692	14,959
iii) Cereal drilling machines with mechanical traction	"	45o	1,428	14,322	15,216
iv) Combines for cereals	"	5o	-	5,5oo	6,129

1o. The increase in a steady rhythm of the home production of tractors and agricultural machinery is correspondingly represented by the equipment of agriculture with modern technique. Thus, while in 195o agriculture only received 3,466 tractors, in 1961 12,o98 tractors were delivered to it (the rest of the tractors having been exported). Thus, the number of tractors and agricultural machinery increased systematically during the entire post-war period, as may be seen below:

a) The number of tractors and of principal agricultural machinery in the Rumanian People's Republic in 1938, 196o and 1962 (summer):

Table 2

	Unit	1938	196o	1962 (June)
i) Physical tractors	pieces	4;o49	44,194	about 54,ooo
ii) Conventional tractors (15 HP)	"	4,858	65,29o	about 8o,ooo
iii) Mechanical drilling machines	"	-	33,948	over 5o,ooo
iv) Self propelled and trailed combines for cereals	"	-	17,577	over 25,ooo

11. As a direct corollary to the action of the technical equipment of agriculture, the proportion of surfaces for one tractor and one combine decreased, and the proportion between mechanical and animal energy employed in agriculture was modified. In 1938, mechanical energy represented 14.3%, and animal energy 85.7%, while in 196o the proportion of mechanical energy had grown to 76.5%, while the animal energy had fallen to 23.5%.

12. The mechanization of agriculture proves its economic efficiency in the large agricultural farms. Therefore, in the conditions existing in Rumania

mechanization cannot be separated from the process of setting up large socialist farms. Our agricultural experience has shown that the parcelled out property excludes the development of social productive forces of labour, social forms of labour, progressive application of science, the increased endowing with permanent funds and large scale animal breeding. Simultaneously with the setting up and the consolidation of large socialist agricultural farms, the degree of utilization of technical farm equipement has also grown. Thus, in 1951 a tractor belonging to the machine and tractor station had done 224 ha of normal ploughing, in 1961 such a tractor has done 475 ha of normal ploughing. Simultaneously the cost price per "hatru" (conventional ha) decreased: by 53% in 1960 and by 62% in 1961 as compared to 1952, which represent a reduction of 2.6 times (1952 - 1961). The respective figures represent an improvement in the use of tractors and an increase in their efficiency.

The increase in the number of tractors and agricultural machinery, and the extension of mechanization in the Rumanian People's Republic agriculture

13. The production of tractors and agricultural machinery must be permanently adapted to the necessities of agriculture; these necessities which result from the structure of agricultural production and the prospects of its development also take into consideration the development of technical progress and the increase in the degree of its applicability in the process of production.

a) In conformity with these requirements, the first tractors produced by our industry ensured the carrying out, in the first place, of heavy land works.

b) Lately, having in view the extension of the heavy works, the production of universal tractors was passed on to tractors with higher technical characteristics and which may be employed in a larger variety of works - as well as to the production of a larger range of agricultural machines. In the structure of the number of tractors, with which agriculture is equipped the proportion of universal tractors (UTOS 26 and UTOS 27) has increased considerably.

14. Number of agricultural tractors in the Rumanian People's Republic existing in 1955, 1960, 1961, on machine and tractor stations and on state agricultural farms, by principal marks:

Table 3

	Unit	1955	1960	1961
a) Total tractors of which:	pieces	19,489	42,691	50,794
b) UTOS 26 and UTOS 27	"	-	26,422	37,814
i) in % from total	%	-	61.9	74.4
c) KD and KDP	pieces	9,386	11,972	9,972
i) in % from total	%	48.2	27.8	19.6

15. At the same time, special attention is lent to the production of trailed combines for cereals, because they make possible the carrying out in a short time of the harvest by economizing labour and eliminating, to a great extent, the harvesting losses.

16. The agricultural machinery industry has enlarged, year by year, the range of machines produced, in relation to concrete necessities, resulting,

in the first place from the structure of cultivated surfaces. Within this structure, the highest proportion is that of cereal crops; hence the necessity of lending paramount attention to the problem of the complex mechanization of cereal crops and in the first place of that of the wheat and maize crops. Concomitently, the mechanization is extended to other crops as well: vegetables, vines etc. Increased attention is also lent to the mechanization of animal breeding.

a) In view of the above mentioned purposes, the range of agricultural machinery with higher technical characteristics has been widened. An exemplifying fact is that in 1961 about 9,000 mounted ploughs and about 1,600 mounted cultivators have been delivered to agriculture. In the state plan for the development of the national economy for 1960 - 1965, assimilation in the production of new, highly efficient agricultural machines is provided for.

17. In the investment volume assigned to agriculture in these years, investments for agricultural machinery and equipment, intended to accelerate the mechanical endowing of agriculture, have been systematically increased. Only for the 1950-60 period, investments in machinery, equipment and other stable funds, amounted to 18,078 million lei, which represents 1,260 lei per ha of agricultural surface. It must be kept in mind that the efficiency of these investments, as well as of the expenses made for land improvements, fertilizers etc., will gradually become evident, in an ever greater proportion, in the coming years.

The economic results of the mechanization of agriculture in the Rumanian People's Republic

18. The endowing of agriculture with tractors and farm machinery, in the framework of its development towards socialism, has been accompanied by considerable economic effects, the importance of which grows by the conclusion of the economic-organizing consolidation of collective agricultural farms. These economic effects of the technical equipment of agriculture materialize in a series of quantitative and qualitative realizations, such as: increased labour productivity, reduction of production costs, increased average and total production, improvement in the structure of cultivated surfaces etc.

a) The volume of works done by the machine and tractor stations has increased year by year. In 1955 they carried out 4,116,000 ha of normal ploughing, in 1960 - 14,180,700 ha, and in 1961 they achieved a volume of work 20,721,800 ha of normal ploughing. This represented a huge economy of labour, estimated at hundreds of thousands of workers a year. It is a significant fact that the increased volume of work was realized both by the increased number of tractors, and by a better use of them, as a consequence, in 1961 almost half of the number of machine and tractor stations achieved more than 500 ha of normal ploughing per 15 HP conventional tractor. The conclusion of collectivization creates the necessary conditions for a further increase in the out-turn per tractor.

b) With the increase in the volume of farm works executed by mechanized means, the degree of mechanization of each individual work has also grown considerably. Thus the degree of mechanization of the principal agricultural works on state farms has increased as follows:

Table 4

in % as compared to mechanized + non-mechanized

	1950	1960	1961
i) Ploughed	70.7	98.9	99
ii) Sown	58.4	96.1	96.8
iii) Harvested cereals	59.8	95.3	96.8

iv) On state agricultural farms these works are practically completely mechanized.

c) The mechanization measures have influenced the increase in total and average productions. The statistical estimates regarding the trend for a long period, show the systematic, firm increase in average production per ha, in all crops.

d) Another effect of the technical equipment of agriculture, and therefore of its mechanization, is the increase in labour productivity. Thus in state agricultural farms, the increase in labour productivity is characterized by the following figures:

Table 5

in %

Indicators	1955	1961
i) The capacity of mechanization means corresponding to 1oo ha of agricultural land	1oo	15o.3
ii) Average productivity per worker in agricultural activity	1oo	2o7.o

iii) To an increase of 5o% in technical equipment corresponds a growth of 1o7% in productivity, a fact which underlines the high efficiency of mechanization, and its influence on the consequent reduction in the cost price of agricultural products.

e) Especially important are the positive consequences of a social, economic and cultural character for the agricultural population whose living standard grows systematically, as well as the consequences for the national economy. They are organically connected with the entire development process of our country, in the conditions of the new socialist system.

The development of mechanization in agriculture in the six-year plan (196o - 1965)

19. State planning for the development of the national economy for the years 196o-1965 provides for important development and mechanization measures in agriculture, ensuring the necessary conditions for this purpose. At the end of the 196o-1965 period, it is expected that some 1oo,ooo physical tractors, more than 7o,ooo drilling machines, over 43,ooo combines for cereals, more than 8,ooo combines for maize, as well as other agricultural machines will be working in agriculture. In 1965, there will be one physical tractor for every 1oo ha of arable land.

2o. The technical equipment and the national utilization of machines, the use on a larger scale of fertilizers, the execution of agrotechnical works of good quality in shorter time and in the most favourable periods, will ensure the increase in agricultural production, in labour productivity, and the reduction of production costs, which will contribute to raise this important branch of economy, its contribution to the complex development of the national economy and, at the same time, the systematic improvement of the living conditions of the population.

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